

## THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A method of producing a transgenic plant comprising the steps of:

1) introducing exogenous genetic material into plant material in the presence of a buffering agent which prevents, reduces the rate of or delays the rise in pH of culture medium or plant material.

2) culturing said plant material in the presence of a buffering agent which prevents, reduces or delays the rate of rise in pH of the culture medium or plant material; and

3) regenerating a transgenic plant from said plant material.

2. A method of transforming a plant comprising the step of introducing exogenous genetic material into plant material in the presence of a buffering agent which prevents, reduces the rate of or delays the rise in pH of culture medium or plant material.

3. A method of producing a transgenic plant from plant material harbouring exogenous genetic material comprising the steps of:

1) culturing said plant material in the presence of a buffering agent which prevents, reduces the rate of or delays the rise in pH of the culture medium or plant material; and

2) regenerating a transgenic plant.

4. A method according to ~~any one of claims 1 to 3~~ wherein the plant is an alkaloid producing poppy plant.

5. A method according to claim 4 wherein the plant is selected from the *Papaver* species or *Eschscholtzia* species.

6. A method according to claim 5 wherein the plant species is *Papaver somniferum*.

7. A method according to ~~any one of claims 1 to 3~~ wherein the plant material is derived from seeds, imbibed seeds or seedling parts of the plant.

8. A method according to ~~any one of claims 1 to 3~~ wherein the plant material is selected from the group comprising seed explant, seedling explant, type I callus, type II callus, somatic embryogenic callus, any culture which gives rise to somatic embryos or shoots and plant tissues such as leaves, stems, roots or flowers.

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9. A method according to <sup>Claim 2</sup> ~~any one of claims 1 to 3~~ wherein the rise in the pH is prevented or delayed.
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10. A method according to <sup>Claim 2</sup> ~~any one of claims 1 to 3~~ wherein the pH is maintained between pH 5.5 and 6.5.
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- 5 11. A method according to <sup>Claim 2</sup> ~~any one of claims 1 to 3~~ wherein the buffering agent is selected from the group consisting of 2-[N-morpholino]ethane sulfonic acid buffer (MES), N-[2-acetamido]-2-iminodiacetic acid buffer (ADA) and bis[2-hydroxyethyl]iminotris-[hydroxymethyl]methane buffer (BIS-TRIS) or a modified ammonium and nitrate ions content in a predetermined ratio.
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- 10 12. A method according to <sup>Claim 2</sup> ~~any one of claims 1 to 3~~ wherein the exogenous genetic material is introduced into plant cells by a plant transformation agent.
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13. A method according to claim 12 wherein the transformation agent is *Agrobacterium tumefaciens*.
14. A method according to <sup>Claim 2</sup> ~~any one of claims 1 to 3~~ wherein the exogenous genetic
- 15 material is introduced using a mechanical method.
15. A method according to claim 14 wherein the mechanical method is microparticle bombardment.
16. A method according to <sup>Claim 4</sup> ~~any one of claims 1 to 6~~ wherein the exogenous genetic
- 20 material encodes a mRNA or protein that confers on the transgenic plant a property selected from the group comprising:
- 25 increased alkaloid yield relative to the native alkaloid producing plant, increased herbicide resistance relative to the native alkaloid producing plant, increased soil acidity tolerance relative to the native alkaloid producing plant, increased disease resistance relative to the native alkaloid producing plant, increased insect resistance relative to the native alkaloid producing plant, increased growth rate relative to the native alkaloid producing plant, improved flowering properties relative to the native alkaloid producing plant, increased frost tolerance relative to the native alkaloid producing plant and altered alkaloid proportions relative to the native alkaloid producing plant.
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17. A method according to <sup>Claim 4</sup> ~~any one of claims 1 to 3~~ wherein the exogenous genetic
- 30 material encodes a mRNA or protein that confers on the transgenic poppy the property of altered alkaloid proportions relative to the native alkaloid producing plant.

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18. A method according to <sup>claim 4</sup> ~~any one of claims 1 to 3~~ wherein the exogenous genetic material encodes a mRNA or protein that confers on the transgenic poppy the property of herbicide resistance.

19. A method according to claim 18 wherein the herbicide resistance is selected from the group consisting of Basta herbicide resistance, glyphosate resistance, bromoxynil resistance and sulfonylurea resistance.

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20. A method according to <sup>claim 2</sup> ~~any one of claims 1 to 3~~ wherein the exogenous genetic material is comprised in a DNA construct based on the binary vector pPZP.

21. A method according to claim 20 wherein the binary vector is pTAB101 with 35S 5':*pat*:35S 3'.

22. A method according to claim 20 wherein the binary vector is pBSF16.

23. A method according to claim 20 wherein the binary vector is pPOP5.

a SUB C7 } 24. A transgenic plant prepared by the method of <sup>claim 2</sup> ~~any one of claims 1 to 23~~.

25. A transgenic plant according to claim 24 wherein the plant is an alkaloid producing poppy plant.

26. A transgenic plant according to claim 25 wherein the plant is selected from the *Papaver* species or *Eschscholtzia* species.

a SUB C8 } 27. A transgenic plant according to claim 26 wherein the species is *Papaver somniferum*.

a 20 28. Plant material when prepared by a method according to <sup>claim 2</sup> ~~any one of claims 1 to 23~~.

a 29. Plant material according to claim 28, selected from the group comprising seed explant, seedling explant, type I callus, type II callus and somatic embryogenic callus.